ACCESSION #: 9910120177

NON-PUBLIC?: N

LICENSEE EVENT REPORT (LER)

FACILITY NAME: LaSalle County Station, Unit 1 PAGE: 1 OF 5

DOCKET NUMBER: 05000373

TITLE: Reactor Scram On Low Reactor Water Level Due to Personnel

Error

EVENT DATE: 09/02/99 LER #: 99-003-00 REPORT DATE: 10/04/99

OTHER FACILITIES INVOLVED: FACILITY NAME DOCKET NO: DOCKET NUMBER

OPERATING MODE: 1 POWER LEVEL: 093

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

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Extension 2929

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE EPIX:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On September 2, 1999, following preventative maintenance on the 1B Turbine Driven Reactor Feed Pump (TDRFP) hydraulic control system, a Non-Licensed Operator (NLO) restored automatic control improperly, causing a sharp drop in 1B TDRFP speed and feed flow. An automatic reactor scram was received on low reactor level.

The NLO was recovering from a prior error in which he had erroneously placed the controlling subloop of the hydraulic control system in manual. This action was not prescribed by the work scope. When he became aware of the error, he failed to notify the control room of the abnormal configuration, and returned the subloop to automatic control. While in manual, an error signal had developed that reduced the feed demand to minimum.

The cause of this event was a personnel error on the part of the NLO. Additional causes include a lack of supervisory oversight and a lack of adherence to administrative control procedures. Corrective actions included an all station stand down to discuss recent human performance problems, counseling the NLO and operating crew, and improving procedural guidance for transferring TDRFP hydraulic control system sub-loops and locking out control oil.

The safety significance of the event was minimal. The plant responded as designed, and the Emergency Core Cooling Systems were not challenged.

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor, 3323 Megawatts Thermal Rated

Core Power

Energy Industry Identification System (EIIS) codes are identified in

the text as [XX].

A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: 09/02/99 Event Time: 1036 Hours

Reactor Mode(s): 1 Power Level(s): 093 Mode(s) Name: Run

B. DESCRIPTION OF EVENT

On September 2, 1999, preventative maintenance was scheduled to

lubricate the 1B Turbine Driven Reactor Feed Pump (TDRFP)(FW)[SJ] low

pressure electro-hydraulic control (LPEHC) 'B' subloop servo valve.

Lubrication of the servo valve is a new preventative maintenance task that has only been performed at LaSalle Station since the early part of 1999. In order to perform this task online, it is necessary to assure that the sub-loop to be lubricated is not in service, and to place the Diagnostic Transfer Switch on control cabinet 1FW07JB into the LOCKOUT position to prevent subloop transfer. The work package provided the necessary instructions to do this work successfully.

A Non-Licensed Operator (NLO) was directed to support the work by taking the Diagnostic Transfer Switch to LOCKOUT. Based on the NLO's previous experience, he chose a procedure that is normally used for filter cleaning to perform the task. After identifying that the 'A' subloop had control, the NLO marked up the procedure to perform the work. He made three errors during this step. The first is that the selected procedure provides direction outside the scope of the work by taking the non-controlling subloop to manual. The second was that he marked up the wrong portion of the procedure. The third error was that he did not get supervisory review of the marked-up procedure as required by the Station's administrative procedure adherence requirements.

At 0920 hours on September 2, 1999, the NLO informed the Unit 1 reactor operator that he was going to lockout the TDRFP. The NLO placed the Diagnostic Transfer Switch to LOCKOUT and verified that the proper lockout lamp was lit. This was the only step required by the

work package, and the system was ready for the lubrication work.
However, the NLO continued with his marked up procedure LOP-FW-14, and erroneously placed the controlling sub-loop 'A' mode switch in manual.
The Instrument Maintenance Technician (IM) who peer checked these steps believed the NLO was taking additional safety measures, and did not question this step. Because the 'A' sub-loop was in control, taking the mode switch to manual placed the 1B TDRFP in local control.
The Control Room was unaware that the pump was in local control.

Although the 1B TDRFP was operating in local manual mode, the speed control system was in automatic. Since being taken to manual by the NLO, the 1B TDRFP flow had remained unchanged at a value slightly above the average pump flow for the power level. This caused the flow controller to develop a signal to reduce the output of 1B TDRFP.
Because the controller was not actually controlling pump speed, the output demand became more negative and had dropped from about 80 percent to approximately 35 percent demand.
At 0941 hours, annunciator 1H13-P603-A510, 111A/B TDRFP Speed Control System Trouble Alarm' was received in the Control Room. This alarm has multiple inputs, and the originating alarm can only be determined at the 1FW06JB local panel in the Auxiliary Building. The NLO saw the "B' sub-loop local alarm appear on 1FW07JB, which confirmed that the IMs were on the correct loop. When the reactor operator called the

NLO to inquire about the Control Room alarm, the NLO convinced him that the alarm was expected because of the ongoing work. The Control Room crew agreed, and an operator was not dispatched to panel 1FW06JB. An IM who was not involved in this activity passed the area and noticed that the 1FW07JB panel was in alarm and stopped to question the NLO. The IM reviewed the local indications for 1B TDRFP and determined that the NLO had taken local control of the 1B TDRFP, and told the NLO to contact the Control Room. While the NLO was considering what action he should take, the IMs performing the lubrication completed the work.

The NLO did not report this condition to the Control Room, but was primarily concerned with restoring control of the 1B TDRFP back to the Control Room. At 1035 hours, the NLO took the 'A' sub-loop mode switch to automatic, even though he recognized that there was a large difference in control oil pressure between the subloops. This action returned the 'A' sub-loop to automatic control with only 35 percent flow demand, resulting in 1B TDRFP speed and flow decreasing to near zero, rapidly decreasing reactor water level, and leading to an automatic reactor scram on low reactor level at 1036 hours. On receipt of the Reactor Low Level alarm, the Control Room crew responded appropriately, but were unable to restore level prior to reaching the scram setpoint 10 seconds later.

The plant responded as expected to a low reactor water level signal,

and the Emergency Core Cooling Systems were not challenged. All systems operated as designed with the following exceptions:

o The Unit 1 Station air compressor tripped during the auxiliary power fast bus transfer.

o The 0C clean condensate pump tripped and the 0A condensate pump was started.

o The 1A and 1C Circulating Water (CW) pumps tripped. The 1B CW Pump continued to operate.

This equipment is non-safety related and did not impact safe shutdown of the plant. These problems continue to be evaluated and corrective actions will be implemented.

This event is reportable under 10 CFR 50.73 (a)(2)(iv) as an event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS).

C. CAUSE OF EVENT

One root cause of this event was a personnel error on the part of the NLO, who, when aware that he was outside of expected conditions, took an improper action instead of informing the control room. This is contrary to procedures, and contrary to operating department expectations.

The second root cause was that several administrative and procedural

barriers failed to identify and prevent the event. The NLO did not receive an adequate pre-job brief, which would have identified his lack of understanding of the scope of the work, and that he was using the wrong procedure. The NLO did not adhere to LAP-100-40, "Procedure Use and Adherence Expectations," when he marked up LOP-FW-14, or when he failed to get supervisory approval of the marked up procedure. The Heightened Level of Awareness (HLA) briefing held before the job failed to identify that locking out the sub-loop was a high risk task. There was no supervisory oversight at the work site when the errors occurred.

There were a number of additional missed opportunities to prevent this event, including the failure of the operating crew to dispatch an operator to the 1FW07JB panel to determine the cause of the "1A/B TDRFP Speed Control System Trouble Alarm" annunciator, and the failure of the NLO to contact the control room in spite of the suggestions from the IM who had originally identified the error.

D. SAFETY ANALYSIS

The safety significance of this event was minimal. The event is bounded by accident analysis as described in the Updated Final Safety Analysis Report. The plant responded as expected to a low reactor water level signal, and the Emergency Core Cooling Systems were not challenged.

A screening evaluation was performed which demonstrated that the risk

significance of this event was minimal. The event is bounded by existing PRA accident sequences for reactor scrams. Additionally, the significance of having the 1B TDRFP unavailable, with one Station Air compressor tripped and 2 of 3 circulating water pumps tripped, does not appreciably increase estimated core damage frequency. This conclusion is based on engineering judgement and confirmed by the online maintenance safety monitor.

E. CORRECTIVE ACTIONS

Immediate Actions:

1. Appropriate disciplinary action was taken with the NLO.

2. Members of the operating crew who had an opportunity to prevent this event were counseled in accordance with Station policy.

3. An all station stand down was held on September 3, 1999, to emphasize the lessons learned from this and other recent human performance events. The Site Vice President discussed the root cause investigation conclusions with Station personnel at the September all hands meeting held on September 23, 1999.

Corrective Actions to Prevent Recurrence:

4. The procedure for Pre-job Briefs and Heightened Level of Awareness (NSP-OP-AA-101-109) was implemented on September 3, 1999 (complete). First line supervisors will be trained as HLA briefing leaders in accordance with improved lesson plans and job

performance measures developed by the HLA HIT team (ATM# 16775-01, 02, 03).

5. A gap analysis was conducted on operator standards and fundamentals, and action plans were developed and will be implemented to address the gaps identified (ATM# 15789-31).

6. The requirements of LAP-100-40, "Procedure Use and Adherence Expectations," will be reinforced with employees (ATM# 15789-19).

F. PREVIOUS OCCURRENCES

LER 02-99-002 "Automatic Scram Due to Failure of Reactor Water Level Control"

On August 21, 1999, at 2251 hours, during a down power, Unit 2 feedwater flow and reactor water level began to oscillate due to a failure of the 2A Turbine Driven Reactor Feedwater Pump (TDRFP) hydraulic control system. Efforts by the reactor operator to restore level control were ineffective, and at 2255 hours the reactor automatically scrammed on low reactor water level.

The root cause of the scram was attributed to a loose diaphragm cover plate on servo valve 2FW163AA. Human performance, command and control, and procedural adherence problems contributed to the event.

The corrective actions to preclude recurrence have not been fully implemented.

LER 01-98-015 "Manual Reactor SCRAM Following Level Control Transient"

While performing level control testing for the 1A TDRFP, automatic level control was lost when the Nuclear Station Operator (NSO) attempted to place it in 3 element automatic control. At plus 50 inches increasing, the NSO inserted a manual SCRAM due to the feedwater transient.

The cause of the scram was attributed to a failure of the control card associated with the Water Level Control System. The corrective actions were focused on troubleshooting and repairing the control card, and would not have prevented this event.

G. COMPONENT FAILURE DATA

Since no component failure occurred, this section is not applicable.

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